CLAIMS

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows. Having thus described the invention what is claimed is:

1. A magnetic sensor, comprising:

a ferromagnetic runner located relative to a target; and

a coil structure wound about said ferromagnetic runner, such that when a magnetic field changes direction along an axial length of said ferromagnetic runner, a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof.

2. The magnetic sensor of claim 1 wherein said coil structure is wound tightly about said ferromagnetic runner, such that said coil structure possesses a number of turns thereof, which is sufficient to achieve a voltage spike amplitude for said interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner.

3. The magnetic sensor of claim 1 further comprising a plurality of interconnecting metals for integrating said ferromagnetic runner and said coil structure with said interfacing circuit.

4. The magnetic sensor of claim 1 further comprising a conductive semiconductor layer located beneath said ferromagnetic runner and an insulated metal to thereby integrate said ferromagnetic runner and said coil structure with said interfacing circuit.

5. The magnetic sensor of claim 1 wherein said ferromagnetic runner

comprises a permalloy runner.

6. The magnetic sensor of claim 1 wherein said coil structure comprises a single coil tightly wound about said ferromagnetic runner.

7. The magnetic sensor of claim 1 wherein said ferromagnetic runner comprises a magnetoresistive material.

8. The magnetic sensor of claim further comprising an interfacing circuit for interfacing said ferromagnetic runner and said coil structure, wherein said ferromagnetic runner and said coil structure are integrated with said interfacing circuit to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current.

9. The magnetic sensor of claim 1 wherein said voltage induced in said coil structure is equivalent to a number of turns of said coil structure multiplied by a cross sectional area of said ferromagnetic runner multiplied by a rate of change of magnetic flux with respect to a change of time.

10. A permalloy magnetic sensor, comprising:

a permalloy runner located relative to a target;

a single coil wound about said permalloy runner, such that when a magnetic field changes direction along an axial length of said permalloy runner, a voltage is induced in said single coil that is proportional to a time range of change of a magnetic flux thereof;

a plurality of interconnecting metals for integrating said permalloy runner and said coil with said interfacing circuit; and

wherein said single coil is wound tightly about said permalloy runner, such that said single coil possesses a number of turns thereof, which is sufficient to achieve a voltage spike amplitude induced at said interfacing when said magnetic field changes direction along said axial length of said permalloy runner, wherein said magnetic sensor is highly sensitive and operates upon a negligible current.

11. The magnetic sensor of claim 10 further comprising an interfacing circuit for interfacing said permalloy runner and said coil structure, wherein said permalloy runner and said coil structure are integrated with said interfacing circuit to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current.

12. The magnetic sensor of claim 10 wherein said voltage induced in said coil structure is equivalent to a number of turns of said coil structure multiplied by a cross sectional area of said permalloy runner multiplied by a rate of change of magnetic flux with respect to a change of time.

13. A magnetic sensor method, comprising the steps of:

winding a coil structure about a ferromagnetic runner, such that when a magnetic field changes direction along an axial length of said ferromagnetic runner, a voltage is induced in said coil structure that is proportional to a time range of change of a magnetic flux thereof; and

interfacing said ferromagnetic runner and said coil structure to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current.

14. The method of claim 13 wherein said coil structure is wound tightly

about said ferromagnetic runner, such that said coil structure possesses a number of turns thereof, which is sufficient to achieve a voltage spike amplitude for said interfacing circuit induced therein when said magnetic field changes direction along said axial length of said ferromagnetic runner.

15. The method of claim 13 further comprising the step of providing a plurality of interconnecting metals for integrating said ferromagnetic runner and said coil structure with said interfacing circuit.

16. The method of claim 13 further comprising the step of locating a conductive semiconductor layer located said ferromagnetic runner and an insulated metal to thereby integrate said ferromagnetic runner and said coil structure with said interfacing circuit.

17. The method of claim 13 wherein said ferromagnetic runner comprises a permalloy runner.

18. The method of claim 13 wherein said coil structure comprises a single coil tightly wound about said ferromagnetic runner.

19. The method of claim 13 wherein said voltage induced in said coil structure is equivalent to a number of turns of said coil structure multiplied by a cross sectional area of said ferromagnetic runner multiplied by a rate of change of magnetic flux with respect to a change of time.

20. The method of claim 13 wherein the step of interfacing said ferromagnetic runner and said coil structure to thereby produce a magnetic sensor for magnetically sensing said target, wherein said magnetic sensor is highly sensitive and operates upon a negligible electrical current, further comprises the step of interfacing said ferromagnetic runner and said coil structure utilizing an interfacing circuit.